

TI-31347

Patent Amendment

REMARKS

This application has been carefully reviewed in light of the Office Action dated December 11, 2003. Applicant has amended claim 11. Reconsideration and favorable action in this case are respectfully requested.

The Examiner has rejected claims 1-3, 6-10 and 14-15 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,430,640 to Lim, in view of U.S. Pat. No. 5,588,111 to Cutts, Jr. et al (hereinafter "Cutts"). Applicants have reviewed these references in detail and do not believe that they disclose or make obvious the invention as claimed.

The Examiner has rejected claim 11 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 6,430,640 to Lim, in view of U.S. Pat. No. 5,588,111 to Cutts, Jr. et al, and further in view of U.S. Pat. No. 6,029,000 to Woolsey et al (hereinafter "Woolsey"). Applicants have reviewed these references in detail and do not believe that they disclose or make obvious the invention as claimed.

Applicant notes with appreciation that the Examiner has indicated that claims 4-5, 12-13 and 16 would be allowable if rewritten in independent form.

A review of the current claims indicated that Claim 11 did not provide antecedent basis for "the CPU". Applicant has amended the claim accordingly.

As stated in the previous response, Lim does not teach or even suggest the novel arbitration method and apparatus claimed in Applicant's base Claims 1, 7 and 8. Lim merely teaches the dynamic assigning of a first priority value to each processor in a multiprocessor system. (Lim: Col 15, lines 9-29). However, Lim does not teach providing two priority values along with each access request from each device, as recited in Claims 1 and 7, or "arbitration circuitry connected to receive a request signal from each request output along with an access priority value from each access priority register and

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an address priority value from each memory management unit" as recited by base Claim 8. The limitations of Lim have been acknowledged by the Examiner, who states "Lim does not specifically disclose two priority values."

The Examiner however has added the Cutts reference to show the use of two priority values, citing PID and VPN of Figure 20 in support. The Examiner states that:

Cutts discloses two priority values (PID and VPN, Fig. 20) and using the higher of priority values from each device (PID reads on this limitation since if the PID does not match the access is [*corrected by Applicant*] denied) for the purpose of providing higher reliability than a single priority value.

Applicant has reviewed the Cutts patent and disagrees with the Examiner's assertion that the PID and VPN of Cutts comprise two priority values. Applicant would further assert that neither the PID nor the VPN of Cutts are used for priority purposes. Both the PID and VPN are parts of a logical address submitted to the TLB for translation to a physical address. The PID is a process identifier which is an extension of the virtual address to form a unique address (column 28, lines 13-18). The PID is used by the TLB to distinguish between different processes operating in the same logical address range. Cutts does not identify any process in which the PID is used for priority to access a resource.

The VPN is the virtual page number, comprising bits 12-31 of a virtual address. The VPN points to a page of memory space. The VPN is translated by the TLB to a physical page address that is concatenated with the lower order bits of the virtual address to form an address in the physical memory (column 28, line 53 through column 29, line 16). Once again, there is no indication in Cutts that the VPN has any function in prioritizing requests to access any resource.

The Examiner's statement that "PID reads on this limitation since if the PID does not match the access id [*sic*] denied...". First, even if the Examiner's statement was

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correct, denial of an access is vastly different than prioritization. Second, if the PID does not match any entries in the TLB, access to the memory is not denied – the TLB simply caches the most recent used virtual address to physical address translations. The failure to match in the TLB (a “miss”) doesn’t terminate the access; it only means that a more time-consuming process for determining the physical address must be performed (see column 29, line 61 et seq.). In any case, matching the PID and VPN in the TLB is a process used solely for virtual to physical address translation and has nothing to do with arbitrating between access requests.

Applicants do not fully understand the Examiner’s statement that “Cutts discloses two separate variable priority values...for the purpose of providing higher reliability than a single priority value.” The PID is used to distinguish between virtual addresses from different processes and the VPN identifies the section of memory to be accessed. Both are necessary in Cutts to translate a virtual address to a physical address. There is no teaching in Cutts of “reliability”. In fact, Applicants could not find the mention of “reliability” in the Cutts specification. Further, Applicants do not believe that the addition of two priority values would provide any meaningful reliability advantage – especially if the values are wholly unrelated in value as they are in Cutts.

The present invention provides significant advantages over the prior art. Using two priority values provides much greater flexibility in accessing a shared resource. For example, a first priority value may be assigned based on a task and a second priority value may be assigned to certain addresses. A first task may have a relatively low priority, except in certain cases where it is accessing a specific area of memory. This would allow other tasks, which may be performing real-time functions, to have priority in all cases other than those in which the first task is accessing the specific area of memory. Such flexible arbitration would not be possible in Lim in view of Cutts.

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For the reasons stated above, Applicants respectfully request allowance of base claims 1, 7 and 8. Further, Applicants respectfully request allowance of dependent claims 2-6 and 9-16.

The Commissioner is hereby authorized to charge any fees or credit any overpayment, including extension fees, to Deposit Account No. 20-0668 of Texas Instruments Incorporated.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Alan W. Lintel, Applicants' Attorney at (972) 664-9595 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,



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